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PATENT**IN THE CLAIMS:**

Claim 1. (Original) A composition for electromagnetic energy-controlled generation and release of a gas comprising:

an energy-activated catalyst capable of being activated by electromagnetic energy, and

a solid or a solids-containing suspension containing anions capable of being oxidized or reacted to generate at least one gas, the composition, when exposed to electromagnetic energy, being capable of generating and releasing the gas after activation of the catalyst and oxidation or reaction of the anions.

Claim 2. (Original) The composition of claim 1 wherein the solid is a salt, an inert material, a polyelectrolyte, a solid electrolyte, or a solid solution.

Claim 3. (Original) The composition of claim 1 wherein the solids-containing suspension is an emulsion or a dispersion.

Claim 4. (Original) The composition of claim 1 wherein the catalyst is selected from the group consisting of a metal oxide, a metal sulfide, a metal chalcogenite, a metal phosphide, a metal arsenide, a non-metallic semiconductor, a polymeric semiconductor, a photoactive homopolyanion, and a photoactive heteropolyion.

Claim 5. (Original) The composition of claim 4 wherein the metal oxide is selected from the group consisting of titanium dioxide, zinc oxide, tungsten trioxide, ruthenium dioxide, iridium dioxide, tin dioxide, strontium titanate, barium titanate, tantalum oxide, calcium titanate, iron (III) oxide, molybdenum trioxide, niobium pentoxide, indium trioxide, cadmium oxide, hafnium oxide, zirconium oxide, manganese dioxide, copper oxide, vanadium pentoxide, chromium trioxide, yttrium trioxide, silver oxide, and  $Ti_xZr_{1-x}O_2$  wherein x is between 0 and 1; the metal sulfide is cadmium sulfide,

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zinc sulfide, indium sulfide, copper sulfide, tungsten disulfide, bismuth trisulfide, or zinc cadmium disulfide; the metal chalcogenite is zinc selenide, cadmium selenide, indium selenide, tungsten selenide, or cadmium telluride; the metal phosphide is indium phosphide; the metal arsenide is gallium arsenide; the non-metallic semiconductor is silicon, silicon carbide, diamond, germanium, germanium dioxide, or germanium telluride; the polymeric semiconductor is polyacetylene; the photoactive homopolyanion is  $W_{10}O_{32}^{4-}$ ; and the photoactive heteropolyion is  $XM_{12}O_{40}^{-n}$  or  $X_2M_{18}O_{62}^{-7}$  wherein x is Bi, Si, Ge, P or As, M is Mo or W, and n is an integer from 1 to 12.

Claim 6. (Currently Amended) The composition of claim 1 wherein the anions are selected from the group consisting of chlorite, bisulfite, sulfite, hydrosulfide, sulfide, hypochlorite, cyanide, bicarbonate, carbonate, peroxide and nitrite.

Claim 7. (Original) The composition of claim 1 wherein the gas is selected from the group consisting of chlorine dioxide, sulfur dioxide, hydrogen sulfide, chlorine, dichlorine monoxide, hydrocyanic acid, carbon dioxide, nitrogen dioxide, nitric oxide, nitrous oxide and ozone.

Claim 8. (Original) A composition for electromagnetic energy-controlled generation and release of a gas comprising:

an energy-activated catalyst capable of being activated by electromagnetic energy, and

anions capable of being oxidized or reacted to generate at least one gas selected from the group consisting of chlorine dioxide, carbon dioxide, sulfur dioxide, hydrogen sulfide, dichlorine monoxide, hydrocyanic acid, nitrogen dioxide, nitric oxide, nitrous oxide, and ozone,

the composition, when exposed to electromagnetic energy, being capable of generating and releasing the gas after activation of the catalyst and oxidation or reaction of the anions.

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Claim 9. (Original) The composition of claim 8 wherein the catalyst is selected from the group consisting of a metal oxide, a metal sulfide, a metal chalcogenite, a metal phosphide, a metal arsenide, a non-metallic semiconductor, a polymeric semiconductor, a photoactive homopolyanion, and a photoactive heteropolyion.

Claim 10. (Original) The composition of claim 9 wherein the metal oxide is selected from the group consisting of titanium dioxide, zinc oxide, tungsten trioxide, ruthenium dioxide, iridium dioxide, tin dioxide, strontium titanate, barium titanate, tantalum oxide, calcium titanate, iron (III) oxide, molybdenum trioxide, niobium pentoxide, indium trioxide, cadmium oxide, hafnium oxide, zirconium oxide, manganese dioxide, copper oxide, vanadium pentoxide, chromium trioxide, yttrium trioxide, silver oxide, and  $\text{Ti}_x\text{Zr}_{1-x}\text{O}_2$  wherein x is between 0 and 1; the metal sulfide is cadmium sulfide, zinc sulfide, indium sulfide, copper sulfide, tungsten disulfide, bismuth trisulfide, or zinc cadmium disulfide; the metal chalcogenite is zinc selenide, cadmium selenide, indium selenide, tungsten selenide, or cadmium telluride; the metal phosphide is indium phosphide; the metal arsenide is gallium arsenide; the non-metallic semiconductor is silicon, silicon carbide, diamond, germanium, germanium dioxide, or germanium telluride; the polymeric semiconductor is polyacetylene; the photoactive homopolyanion is  $\text{W}_{10}\text{O}_{32}^{-4}$ ; and the photoactive heteropolyion is  $\text{XM}_{12}\text{O}_{40}^{-n}$  or  $\text{X}_2\text{M}_{18}\text{O}_{62}^{-7}$  wherein x is Bi, Si, Ge, P or As, M is Mo or W, and n is an integer from 1 to 12.

Claim 11. (Original) A composition for electromagnetic energy-controlled generation and release of at least one gas comprising:

an energy-activated catalyst capable of being activated by electromagnetic energy; and

chlorite, nitrite, or peroxide anions;

the composition, when exposed to electromagnetic energy, being capable of generating and releasing chlorine dioxide, a nitrogen oxide, or ozone after activation of the catalyst and oxidation or reaction of the anions.

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Claims 12-37. (Withdrawn)

Claim 38. (Original) A composition for photo-controlled generation and release of at least one gas comprising:

a photocatalyst capable of being activated by light, and  
a solid or a solids-containing suspension containing anions capable of photo-oxidizing or reacting to generate at least one gas,  
the composition, when exposed to light, being capable of generating and releasing the gas after activation of the photocatalyst and photo-oxidation or reaction of the anions.

Claim 39. (Original) The composition of claim 38 wherein the solid is a salt, an inert material, a polyelectrolyte, a solid electrolyte, or a solid solution.

Claim 40. (Original) The composition of claim 38 wherein the solids-containing suspension is an emulsion or a dispersion.

Claim 41. (Original) The composition of claim 38 wherein the photocatalyst is selected from the group consisting of a metal oxide, a metal sulfide, a metal chalcogenite, a metal phosphide, a metal arsenide, a non-metallic semiconductor, a polymeric semiconductor, a photoactive homopolyanion, and a photoactive heteropolyion.

Claim 42. (Original) The composition of claim 41 wherein the metal oxide is selected from the group consisting of titanium dioxide, zinc oxide, tungsten trioxide, ruthenium dioxide, iridium dioxide, tin dioxide, strontium titanate, barium titanate, tantalum oxide, calcium titanate, iron (III) oxide, molybdenum trioxide, niobium

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pentoxide, indium trioxide, cadmium oxide, hafnium oxide, zirconium oxide, manganese dioxide, copper oxide, vanadium pentoxide, chromium trioxide, yttrium trioxide, silver oxide, and  $Ti_xZr_{1-x}O_2$  wherein x is between 0 and 1; the metal sulfide is cadmium sulfide, zinc sulfide, indium sulfide, copper sulfide, tungsten disulfide, bismuth trisulfide, or zinc cadmium disulfide; the metal chalcogenite is zinc selenide, cadmium selenide, indium selenide, tungsten selenide, or cadmium telluride; the metal phosphide is indium phosphide; the metal arsenide is gallium arsenide; the non-metallic semiconductor is silicon, silicon carbide, diamond, germanium, germanium dioxide, or germanium telluride; the polymeric semiconductor is polyacetylene; the photoactive homopolyanion is  $W_{10}O_{32}^{4-}$ ; and the photoactive heteropolyion is  $XM_{12}O_{40}^{-n}$  or  $X_2M_{18}O_{62}^{-7}$  wherein x is Bi, Si, Ge, P or As, M is Mo or W, and n is an integer from 1 to 12.

Claim 43. (Original) The composition of claim 38 wherein the anions are selected from the group consisting of chlorite, bisulfite, sulfite, hydrosulfide, sulfide, hypochlorite, cyanide, bicarbonate, carbonate and nitrite.

Claim 44. (Original) The composition of claim 38 wherein the gas is selected from the group consisting of chlorine dioxide, sulfur dioxide, hydrogen sulfide, chlorine, dichlorine monoxide, hydrocyanic acid, carbon dioxide, nitrogen dioxide, nitric oxide, nitrous oxide and ozone.

Claim 45. (Original) The composition of claim 38 wherein the light is ultraviolet light or visible light.

Claim 46. (Original) A composition for photo-controlled generation and release of at least one gas comprising:  
a photocatalyst capable of being activated by light, and

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anions capable of photo-oxidizing or reacting to generate at least one gas selected from the group consisting of chlorine dioxide, carbon dioxide, sulfur dioxide, hydrogen sulfide, dichlorine monoxide, hydrocyanic acid, nitrogen dioxide, nitric oxide, nitrous oxide and ozone, the composition, when exposed to light, being capable of generating and releasing the gas after activation of the photocatalyst and photo-oxidation or reaction of the anions.

Claim 47. (Original) The composition of claim 46 wherein the photocatalyst is selected from the group consisting of a metal oxide, a metal sulfide, a metal chalcogenite, a metal phosphide, a metal arsenide, a non-metallic semiconductor, a polymeric semiconductor, a photoactive homopolyanion, and a photoactive heteropolyion.

Claim 48. (Original) The composition of claim 47 wherein the metal oxide is selected from the group consisting of titanium dioxide, zinc oxide, tungsten trioxide, ruthenium dioxide, iridium dioxide, tin dioxide, strontium titanate, barium titanate, tantalum oxide, calcium titanate, iron (III) oxide, molybdenum trioxide, niobium pentoxide, indium trioxide, cadmium oxide, hafnium oxide, zirconium oxide, manganese dioxide, copper oxide, vanadium pentoxide, chromium trioxide, yttrium trioxide, silver oxide, and  $Ti_xZr_{1-x}O_2$  wherein x is between 0 and 1; the metal sulfide is cadmium sulfide, zinc sulfide, indium sulfide, copper sulfide, tungsten disulfide, bismuth trisulfide, or zinc cadmium disulfide; the metal chalcogenite is zinc selenide, cadmium selenide, indium selenide, tungsten selenide, or cadmium telluride; the metal phosphide is indium phosphide; the metal arsenide is gallium arsenide; the non-metallic semiconductor is silicon, silicon carbide, diamond, germanium, germanium dioxide, or germanium telluride; the polymeric semiconductor is polyacetylene; the photoactive homopolyanion is  $W_{10}O_{32}^{-4}$ ; and the photoactive heteropolyion is  $XM_{12}O_{40}^{-n}$  or  $X_2M_{18}O_{62}^{-7}$  wherein x is Bi, Si, Ge, P or As, M is Mo or W, and n is an integer from 1 to 12.

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**Claim 49. (Original) The composition of claim 46 wherein the light is ultraviolet light or visible light.**

**Claim 50. (Original) A composition for photo-controlled generation and release of at least one gas comprising:**

**a photocatalyst capable of being activated by light, and  
chlorite, nitrite or peroxide anions,  
the composition, when exposed to light, being capable of generating and  
releasing chlorine dioxide, a nitrogen oxide, or ozone after activation of the  
photocatalyst and photo-oxidation or reaction of the anions.**

**Claims 51-78. (Withdrawn)**